

AMENDMENTS
TO
THE WATER QUALITY CONTROL PLAN FOR THE
SACRAMENTO RIVER AND SAN JOAQUIN RIVER
BASINS

FOR

THE CONTROL OF DIAZINON AND CHLORPYRIFOS
RUNOFF INTO THE LOWER SAN JOAQUIN RIVER

RESPONSES TO SCIENTIFIC PEER REVIEW COMMENTS;
PUBLIC COMMENTS ON
AUGUST 2005 STAFF REPORT; AND CALIFORNIA
ENVIRONMENTAL QUALITY ACT (CEQA) SCOPING
COMMENTS

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Response to Public Comments on August 2005 Staff Report

The following provides staff's response to comments on "Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Diazinon and Chlorpyrifos Runoff into the Lower San Joaquin River"; Public Review Draft Staff Report; August 2005 (Staff Report). A summary of the comment and recommendation is provided followed by the staff response.

1. David B. Weinberg, Wiley Rein & Fielding LLP; Representing Makhteshim-Agan of North America, Inc.

General Comment 1: Compliance with the new labeling is likely to accelerate the trend [of decreasing diazinon concentrations in the San Joaquin River]. If any exceedances are measured in the future, they likely will be the result of the failure of one or a handful of individual applicators to follow label directions.

This reality emphasizes why it is so important to minimize the obligations imposed by the proposed Basin Plan amendments on the majority of diazinon users (and other "Ag Waiver" coalition members). This in turn translates to not requiring excessive monitoring or report writing by individual growers or coalitions, and assuring that any actions that monitoring reveals to be necessary are carefully targeted and cost-effective. The Board must realize that the imposition of the significant costs associated with overly-broad monitoring programs itself provides an incentive to growers to "deselect" use of diazinon products. It is neither fair nor appropriate for the Board to impose burdens that may have that effect without very first exploring less expensive options.

Response to General Comment 1: The Central Valley Water Board agrees that there appears to be a trend of decreasing concentrations of diazinon in the San Joaquin River. Compliance with the new diazinon labels by diazinon users should support that trend. The Central Valley Water Board does not believe that the monitoring program is overly broad given the trends in diazinon concentration.

The structure of the monitoring program is necessary to allow the Central Valley Water Board to track compliance with diazinon and chlorpyrifos water quality objectives and allocations, as well as determine whether alternatives to diazinon and chlorpyrifos are causing water quality problems. The information to be submitted can be based on data collected by other organizations and need not rely solely on information collected by the discharger. In addition, the specific monitoring requirements developed through the applicable monitoring and reporting program can be adjusted based on review of pesticide use trends and patterns and associated water quality results (e.g. less intense monitoring if compliance is consistently achieved or more intense monitoring if water quality appears to be degrading due to pesticide runoff). We believe the monitoring

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identified in this Basin Plan Amendment provides the appropriate mix of information necessary to evaluate any pesticide impacts and flexibility so that growers discharging pesticides can minimize the cost of providing that information.

General Comment 2: Second, there is no rational basis to imposing any obligations on growers based on any “additive toxicity” analysis. [The Commenter suggests, based on their analysis that the low co-occurrence of diazinon and chlorpyrifos, that it is not necessary to consider additive toxicity as part of this Basin Plan Amendment]

Response to General Comment 2: The Commenter raises a number of issues with respect to the consideration of additive toxicity. The Commenter does not dispute the fact that diazinon and chlorpyrifos exhibit additive toxicity, but questions whether it is necessary to consider additive toxicity. The Commenter also states that Dr. Felsot, the peer reviewer, had concerns that diazinon and chlorpyrifos were not additive below a certain threshold.

The Central Valley Water Board’s Basin Plan directly addresses additive toxicity in a number of sections (e.g. III-6.00, III-9.00-10.00; IV-16.00 – IV-18.00; IV-35.00). Diazinon and chlorpyrifos both have a similar mode of action and have exhibited additive toxicity (Bailey, et al, 1997; Siepmann and Finlayson, 2000). The current additive toxicity regulatory provisions in the Basin Plan do not provide for an exception to consideration of additive toxicity based on the observed frequency of co-occurrence. In order to protect the applicable beneficial uses, the Central Valley Water Board is required to consider the additive effect of these two pesticides when establishing the loading capacity and allocations.

Dr. Felsot’s comment regarding the apparent lack of additivity of diazinon and chlorpyrifos below a certain threshold was based on a statement in the Bailey, et al (1997) study. That study indicated mortality to *Ceriodaphnia dubia* was not observed when the toxic units of diazinon and chlorpyrifos added up to about 0.50 toxic units (1 toxic unit would equate to the LC50 (lethal concentration to 50% of the organisms)). The lack of observed mortality suggests that the threshold concentration for causing lethality was not observed, but does not provide any evidence as to whether other effects may have occurred.

In addition, it should be noted that the Central Valley Water Board cannot establish water quality objectives equivalent to an LC50, since beneficial uses would not be protected (i.e. lethal concentrations of the pollutant would be present in the waterbody). The water quality objectives established by the Central Valley Water Board are designed to protect beneficial uses and are not established at levels that equate to a specific toxic response to specific organisms. Consequently, when considering the co-occurrence of pesticides that act in an additive fashion, the Central Valley Water Board is not trying to predict a specific toxic response, but is ensuring the protection of beneficial uses.

Given the clear scientific evidence of the additive toxicity of diazinon and chlorpyrifos and the clear Basin Plan requirements to consider additivity to protect beneficial uses, the

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Central Valley Water Board must use an additive toxicity formula in establishing the loading capacity and allocations.

General Comment 3: Third, another valid and important aspect of Dr. Felsot's "peer review" comments is not reflected in the draft report: the Draft incorrectly uses the water quality target (which contains a safety factor) in the denominator of the additivity equation for diazinon and chlorpyrifos. Dr. Felsot is correct in advising that the denominator in this formula must be based on a definitive toxicity endpoint (e.g., an LC50), not a value that already includes a 2-fold safety factor. If the Board continues to include any additivity analysis or requirement in the Basin Plan revision, this correction should be made so that a well-accepted science-based approach is employed.

Response to General Comment 3:

Dr. Felsot initially suggested two alternatives to using the water quality objectives in the denominator of the additivity formula. Both alternatives relied on using a relative potency factor (RPF) to normalize the concentrations of diazinon and chlorpyrifos. Dr. Felsot's ultimate recommendation was to normalize the diazinon concentrations to chlorpyrifos toxic equivalents and compare the total chlorpyrifos toxic equivalents to the proposed chlorpyrifos objectives. In other words, Dr. Felsot did not suggest that the chlorpyrifos toxic equivalents be compared to the LC50 for *Ceriodaphnia dubia*.

Dr. Felsot suggested the RPF could be based either on the ratio of chlorpyrifos to diazinon LC50s of a sensitive organism, such as *Ceriodaphnia dubia*, or could be based on the ratio of the chlorpyrifos to diazinon Final Acute Values (FAVs) calculated using the U.S. EPA methodology for deriving criteria. Dr. Felsot appeared to favor basing the RPFs on the FAVs, since the FAV incorporates data from a number of species.

The Central Valley Water Board evaluated Dr. Felsot's suggested proposal to derive chlorpyrifos toxic equivalents by using relative potency factors in depth (see pages 64 and 65 and Appendix E). We agreed with Dr. Felsot that using the ratio of the FAVs was preferable since a greater amount of toxicity data was incorporated into the FAV calculations. Since the safety factors applied to the diazinon and chlorpyrifos FAVs to derive the criteria are the same, the toxic equivalents approach suggested by Felsot and the additive formula in the Basin Plan produce equivalent results. Since both approaches to calculating the loading capacity produce the same results, the Central Valley Water Board will rely on the formula that is already established in the Basin Plan.

It should also be noted that the additive formula is not meant to be a predictor of a specific toxic response. The formula is applied to ensure that beneficial uses are protected when more than one pesticide is present in the waterbody. The derivation of individual water quality objectives does not generally consider the presence of other pollutants that may impact beneficial uses. In absence of the application of the additivity formula in the Basin Plan, the individual criteria for diazinon and chlorpyrifos would

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need to be lowered to account for the potential co-occurrence of the two pesticides, otherwise, the Central Valley Water Board would not be able to conclude that beneficial uses were protected.

General Comment 4: Finally, MANA applauds the reduced emphasis in this Draft on the findings of Dr. Sholz. MANA fully shares Dr. Felsot's views about the limitations of that work, as is more fully explained in Attachment D.

Response to General Comment 4: The Commenter agrees with the Draft with respect to Dr. Sholz's studies. No change in the staff report or Amendment is suggested.

Specific Comments from MANA

Comment 1: Current conditions are sufficiently different from historic conditions that it is unreasonable to rely on pre-2000 monitoring data to justify action.

Response to Comment 1: The Commenter suggests that the Central Valley Water Board relied on historic conditions (pre-2000) to justify its action. The Commenter acknowledges that the Staff Report did focus on more recent data in different parts of the text, but the Commenter disagrees with the characterization of the monitoring data on three pages of the text. See late revisions to the Staff Report for changes that have been made in response to this comment.

Comment 2: If the Board intends to rely on chemical parameters in setting a diazinon numeric water quality objective, there is little reason for a significant delay in doing so.

Response to Comment 2: The Commenters suggestion appears to be that the Central Valley Water Board should adopt the diazinon water quality objective at this time, rather than at a later time. The Staff Report analyzed the alternative to adopt diazinon water quality objectives and other commenters have suggested that the Central Valley Water Board adopt diazinon objectives rather than relying on diazinon targets to establish the loading capacity and allocations. In response to these comments, staff is now recommending that the Central Valley Water Board adopt the diazinon water quality objectives analyzed in the Staff report (0.160 µg/L and 0.100 µg/L for the acute and chronic objectives respectively).

The Commenter suggests that the Central Valley Water Board should use the 0.15 µg/L acute and chronic criteria staff calculated based on the U.S. EPA dataset or the 0.165 µg/L criteria calculated by Hall (as shown in Attachment J of their comments). The Central Valley Water Board believes the recommended acute and chronic objectives for diazinon calculated based on the California Department of Fish and Game data set is appropriate (0.160 µg/L and 0.100 µg/L). The U.S. EPA dataset did not include toxicity study results on the acute to chronic ratio that were included in the CDFG dataset. The Central Valley Water Board believes this information must be taken into account. The

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information provided by the Commenter does not provide a justification for a change from the recommended objectives.

The Commenter also refers to a number of other attachments (F,G, H, and I) in comment 2. The attachments contain information related to MANA's comments on the Sacramento/Feather River diazinon Basin Plan Amendment (Resolution No. R5-2003-0148) . Besides the direct reference to the Hall diazinon calculations, the Commenter does not specify which of the previous comments are germane to the current Amendment before the Central Valley Water Board. To the extent that the Commenter believes their comments on the Sacramento/Feather River diazinon Basin Plan Amendment apply to this Amendment, the Central Valley Water Board incorporates by reference its response to MANA's comments on the Sacramento/Feather River diazinon Basin Plan Amendment, including any Central Valley Water Board responses to comments submitted by MANA after the Central Valley Water Board adopted the Sacramento/Feather River diazinon Basin Plan Amendment.

Comment 3: There is no basis to incorporate an additivity-based element in this amendment.

Response to Comment 3: See response to MANA's general comments 2 and 3 above.

Comment 4: The draft uses the wrong denominator in its additivity analysis.

Response to Comment 4: See response to MANA's general comments 2 and 3 above.

Comment 5: The text of the Amendment should be revised to make it clear that only exceedances related to diazinon could result in a prohibition of diazinon use.

Response to Comment 5: The prohibition language has been changed to address this comment.

Comment 6: The discussion of the WTC decision misconstrues the holding.

Response to Comment 6: The sentence referred to by the Commenter has been deleted.

Comment 7: The Draft correctly rejects the 1/10 approach in interpreting narrative objectives.

Response to Comment 7: See response to Comment 2.

Comment 8: No basis exists for the Board to determine that the presence of diazinon in surface waters does not benefit the people of California.

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Response to Comment 8: Central Valley Water Board staff is not recommending the alternative to which the comment refers. The Commenter requests that the discussion of the alternative be revised to note that it is theoretical. The Central Valley Water Board does not believe the alternative to be theoretical, but considers it to be a viable policy that the Central Valley Water Board could choose to adopt (see for example the existing Basin Plan “Policy for Application of Water Quality Objectives”). The Central Valley Water Board need not allow the discharge of waste, even if such discharge does not impact beneficial uses (the discharge of waste in California is a revocable privilege and not a right). It should also be noted that the lawful use of diazinon under applicable State and federal pesticide laws does not provide for the application of diazinon to waterways or the discharge of diazinon to waterways.

Comment 9: A long-term schedule of compliance should be adopted.

Response to Comment 9: The Central Valley Water Board believes it is appropriate to change the suggested compliance date to 2010. The Amendment has been changed accordingly. The Central Valley Water Board believes that additional time should be given between the anticipated approval date of the Amendment and the compliance date. The additional time should allow dischargers to establish any necessary monitoring programs and to implement any additional management practices prior to the compliance date.

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2. G. Fred Lee, PhD, DEE and Anne Jones-Lee, PhD

General Comment: Detailed information on how compliance will be assessed should not be separated from the adoption of the TMDL into the Basin Plan. Without such information, it will not be possible to evaluate the adequacy of the proposed approach for controlling the aquatic life toxicity caused by the OP pesticides, diazinon, or chlorpyrifos, or the replacement of these chemicals by other pesticides that could cause aquatic life toxicity in the SJR.

Response to General Comment: The Basin Plan Amendment identifies six compliance points for the calculation of the loading capacity. The Amendment also describes the information that must be collected as part of any monitoring and reporting program (MRP) governing pesticide discharge from orchards and fields. The Central Valley Water Board believes these two elements of the Basin Plan Amendment provide the appropriate regulatory framework for assessing compliance with the Amendment. The MRP will be the vehicle used to provide any additional detail necessary.

Including detailed monitoring requirements in the Basin Plan would unnecessarily constrain the Central Valley Water Board's flexibility to respond to new information and any emerging pesticide runoff issues. By incorporating detailed monitoring requirements in the Basin Plan, the Central Valley Water Board would be locked into a specific monitoring approach even if new information suggested a better way for assessing compliance with the Amendment.

By identifying the detailed requirements as part of an MRP, the Central Valley Water Board would be able to take advantage of the most recent monitoring data and information on analytical methods to structure the monitoring program. The Central Valley Water Board also wants to ensure that the monitoring program does not include requirements that are unnecessary or redundant of other efforts. A detailed monitoring program specified in the Basin Plan that may be appropriate and relevant now may not be in the future. Making changes to a monitoring program defined in the Basin Plan would be a multi-year process, whereas, changes to an MRP can take place within weeks or months of the identified need for a change.

Comment 1: Need for Information on the Proposed TMDL Compliance Monitoring
The Regional Board should specify the initially proposed characteristics of the SJR OP Pesticide TMDL compliance monitoring program. This would include the anticipated compliance points for the monitoring program, parameters to be measured, analytical methods and their sensitivity for reliably detecting the regulated chemicals, frequency of measurements, etc. With such information it will be possible to evaluate whether the proposed compliance monitoring could be expected to be adequate for detecting significant violations of the requirements set forth in the TMDL.

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Response to Comment 1: See response to General Comment. The Amendment currently outlines the general characteristics of the monitoring program (see additions to Monitoring and Surveillance chapter). The minimum compliance points for the loading capacity have also been identified. The Central Valley Water Board agrees that the specific issues identified by the Commenter will need to be addressed as part of the MRP, but does not agree that the specific parameters of the monitoring program are appropriate for this rulemaking. The pesticide use patterns, primary pesticides of concern, concentration trends or analytical methods are likely to change to a significant enough degree from year to year to warrant relying on the flexibility provided through an MRP rather than incorporating those specifics into the Basin Plan.

Comment 2: Dormant Pesticide Applications

One of the issues of concern regarding compliance monitoring is the application of dormant-spray pesticides to orchards just prior to major stormwater runoff events. In order to provide a technically valid assessment of compliance with the TMDL target goals, the compliance monitoring should specifically include monitoring immediately after major runoff events when there is the greatest likelihood of failure to comply with TMDL targets.

Response to Comment 2: The Central Valley Water Board agrees that monitoring should take place after storm events that are likely to produce runoff containing dormant spray pesticides. The Central Valley Water Board does not believe such a requirement is appropriate to incorporate into the Basin Plan. The factors that must be considered in capturing runoff from such events include the antecedent soil moisture conditions; the amount of pesticide applied; the number and intensity of prior storm events; and the intensity and duration of the storm event being monitored. The Central Valley Water Board's own experience with storm event monitoring suggests that it is difficult to define the specific conditions that trigger sending out a crew to collect storm samples. Given these difficulties and the number of variables to consider, the Central Valley Water Board does not believe it would be appropriate to try to describe in the Basin Plan the conditions that would require stormwater runoff monitoring.

Comment 3: Non-Dormant Applications

The runoff/discharges following application of chlorpyrifos and/or other pesticides in the spring, summer and fall should be monitored to determine whether violations of the chlorpyrifos water quality objective occur. As part of developing the application protocol for non-dormant pesticides an examination should be made of the conditions that have in the past led to aquatic life toxicity or violations of the TMDL target goals for non-dormant pesticide. The compliance monitoring regimen should include periodic examination of how pesticides are being used in the San Joaquin River watershed. This information should be used to guide development and implementation of the ongoing TMDL compliance monitoring program.

Response to Comment 3: No changes to the Amendment are suggested. The Central Valley Water Board agrees that monitoring during the non-dormant season should take place and believes the Amendment requires such monitoring. The Central Valley Water

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Board also agrees that evaluating pesticide use patterns will help guide such monitoring. Note that the periodic review of use patterns suggested for the non-dormant season also applies to the dormant season and supports the Central Valley Water Board's approach of using the MRP to define the specific monitoring requirements.

Comment 4: Monitoring Methodology

The TMDL compliance monitoring should include determination of the total amount of aquatic life toxicity measured in a sample and how much of that toxicity can be accounted for based on the concentrations of diazinon and chlorpyrifos found in the sample.

Response to Comment 4: The Amendment currently requires the applicable MRP to provide information necessary to determine whether the discharges cause or contribute to a toxicity impairment. The Central Valley Water Board will consider the Commenter's detailed suggestions on methods when working with dischargers on their MRP. See the previous response to the Commenter regarding the Central Valley Water Board's view on the appropriateness of providing the detail suggested.

Comment 5: Sediment Toxicity

The OP pesticide TMDL compliance monitoring should include sediment toxicity testing using the US EPA (2002d) procedure using *Hylella azteca* as the test organism. Only the acute testing procedure should be conducted since the chronic testing procedure has been found by Weston (2005) to be unreliable.

Response to Comment 5: See response to Comment 4.

Comment 6: Aquatic Life Toxicity Monitoring for Non-TMDL Pesticide Situations

The recommended TMDL compliance monitoring program presented herein is also applicable to all aquatic life toxicity monitoring in stormwater runoff, and fugitive water and tail water discharges. Monitoring programs that only measure water column toxicity without the follow up monitoring recommended herein fails to provide the information needed to provide magnitude of the toxicity and its potential cause.

Response to Comment 6: The comments have been forwarded to the appropriate Central Valley Water Board program staff.

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3. Wendell Kido, District Manager; Sacramento Regional County Sanitation District

Comment 1: Proposed Amendment Should Not Use Diazinon Target in lieu of Adopting a Diazinon Water Quality Objective. SRCSA does not support this approach and requests that the proposed amendment be modified to adopt an appropriate diazinon concentration as an objective pursuant to sections 13241 and 13242 and section 13000 of the California Water Code.

Response to Comment 1: The resolution has been revised to recommend adoption of the proposed diazinon water quality targets as water quality objectives. This alternative has already been evaluated in the Staff Report and all required analysis of this alternative has been performed. The original staff recommendation to use water quality targets to establish the loading capacity and allocations was based on a staff preference to conduct additional studies and review prior to establishing the diazinon water quality objectives.

Comments from other interested parties have suggested that the information available at this time is sufficient to establish diazinon water quality objectives. Staff agrees with that assessment and recommends that the Central Valley Water Board establish diazinon objectives. Staff believes that any necessary revisions to the diazinon objectives can be made as part of the effort to review and potentially revise the diazinon objectives for the Sacramento and Feather Rivers, which is scheduled to be completed by June 2007.

Comment 2: Regional Board should not prepare a TMDL for Diazinon if it is unclear that Impairment Exists. This open debate clearly shows that the diazinon numeric water column concentration that is deemed to be reasonably protective of aquatic life uses should go through the water quality objectives process instead of being adopted as a target.

Response to Comment 2: See response to Comment 1. Staff has reviewed both the “No Change” alternative to the water quality objectives, which would apply diazinon water quality targets to the loading capacity and allocations calculations, as well as adoption of diazinon water quality objectives. The Central Valley Water Board believes that the data shows that the presence of diazinon and chlorpyrifos (individually and in combination) has caused and still has the potential to cause exceedance of water quality objectives. The Central Valley Water Board anticipates that the positive trends in water column concentrations should continue with implementation of new use restrictions. The Central Valley Water Board believes that the implementation program described in the Basin Plan Amendment provides a critical regulatory framework to ensure those trends continue and are sustained. Although the Amendment includes elements (i.e. loading capacity and allocations) that also satisfy Clean Water Act TMDL requirements, those and other elements of the implementation program are necessary components of a viable program to control diazinon and chlorpyrifos discharges to the San Joaquin River.

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Comment 3: The Proposed Basin Plan Amendment provides no certainty to permitted dischargers. Based on the language in general and the specific language on page 62 of the Public Review Draft Staff Report, the proposed Basin Plan Amendment provides no certainty as to the regulatory impact of the application of adopted water quality objectives for diazinon. The Public Review Draft contains the statement that if new information indicates that a numeric objective is not protective enough that “the Regional Board could still apply the narrative objectives to ensure protection of beneficial uses while it went through the process of amending the numeric objective.” This statement undermines the intent and purpose of adopting numeric water quality objectives into the Basin Plan. According to this statement, the Regional Board can ignore an adopted numeric objective whenever new information is published (regardless of the credibility of the information) that suggests that the criteria should be lower.

If this statement were true, then there would be no need to have adopted numeric objectives. SRCSD does not support the legality of the statement as made in the Public Review Draft. It is an established legal principle that more specific provisions in statute or regulation supersede more general provisions. In this case, a numeric water quality objective is more specific than a narrative objective and therefore it would supersede a general narrative objective. Thus, an adopted numeric water quality objective for diazinon would be the applicable objective until the objective was properly amended according to the law.

Response to Comment 3: The Central Valley Water Board disagrees with the Commenter’s characterization of the applicability of narrative and numeric water quality objectives. In issuing waste discharge requirements, the Central Valley Water Board is required to implement the Basin Plan and take into consideration other factors. In issuing NPDES permits, the Central Valley Water Board is required to be no less stringent than federal requirements and must include effluent limitations to implement both narrative and numeric water quality standards. If both narrative and numeric water quality objectives apply to a given pollutant, the most stringent objective applies such that all beneficial uses are protected (see, for example, the Basin Plan at page III-6.00). In addition, the Basin Plan requires consideration of additive toxicity. The proposed objectives are intended to be protective of the beneficial uses of aquatic life, which is the most sensitive beneficial use with respect to these pollutants. The permitting process is a public process that requires all the factors to be considered in determining the requirements of the permit.

Comment 4: The Public Review Draft assumes that the non-agricultural use bans for chlorpyrifos and diazinon will allow municipal wastewater dischargers to comply with the proposed Waste Load Allocations. However, the Public Review Draft does not look at any municipal wastewater data to determine if this statement is true.

Response: Staff has reviewed NPDES permit monitoring data submitted to the Central Valley Water Board from 2002 through 2005 from the Turlock Irrigation District and

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from the City of Modesto. Although no detections of either pesticide were found, the required reporting limits for these pesticides were 0.250 ug/L (diazinon) and 1 ug/L (chlopyrifos), which are well above the proposed water quality objectives.

As discussed in the Staff Report, the cancellation of urban uses of diazinon is expected to be sufficient for meeting the waste load allocations. No other treatment technology or management practice is expected to be required, so there is no basis for providing estimates of additional costs for compliance. Regional Board staff will consider incorporating additional cost estimates, if the necessary information to estimate such costs is provided. Such information would include: 1) Estimated diazinon concentration levels in NPDES discharges after December 31, 2010 (the revised compliance date); 2) expected management practice or treatment requirements associated with reducing those estimated levels to the waste load allocations; and 3) estimated cost of the management practice or treatment technology.

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4. Debra Denton, Ph.D., Environmental Scientist, U.S.EPA. Region 9

Comments:

We support the language under surveillance and monitoring which addresses pesticide runoff from orchards and fields in the Valley as this is consistent with the adopted Sacramento River diazinon TMDL. We support that the joint toxicity of these chemicals be expressed as a measurement of additive toxicity in the calculation of the loading capacity. We support the calculation of toxic equivalents calculation according to the Board's Basin Plan's method for considering additive toxicity as this approach applies to both acute and chronic endpoints. In addition, this approach is easily applicable to additional chemicals besides the two pesticides currently being addressed in this action.

Response:

Staff appreciates U. S. EPA Region 9's support of the approach used in the Basin Plan Amendment.

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5. John S. Sanders, Ph.D., Branch Chief, Environmental Monitoring Branch, California Department of Pesticide Regulation

Comment 1: *Page 13, paragraph 2:* The last sentence states that pesticides are likely to be one of the factors that contributed to declines in populations of invertebrates and fish in the San Francisco Estuary. The report references the Interagency Ecological Program (2004). Actually, to better help the reader find the source(s) of information presented in this paragraph, the references should be Mecum (2004) and Chappell (2004). It is difficult to substantiate the paragraph's last sentence with these references. When Mecum ventured to suggest reasons why invertebrate populations were declining, pesticides were not mentioned. Chappell made several observations about trends in catch and escapement of Central Valley Chinook salmon but did not suggest that pesticides or other pollutants may have affected these trends. We recommend that the Regional Board soften statements in the report that link population declines and other community level effects with the presence of pesticides unless more solid substantiation can be referenced.

Response to Comment 1: The report has been revised to identify the specific articles in the IEP 2004 reference that were used. An additional reference has been provided for the sentence in question.

Comment 2: *Page 13, paragraph 3:* The first sentence attempts to explain the fate of dormant sprays after application by way of a simple budget. Some of the pesticides will remain on the target plants as well.

Response to Comment 2: The sentence has been revised to include the statement that some of the pesticide will remain on the target plant.

Comment 3: *Page 13, last paragraph (resumes on page 14):* The last sentence states that the use of drip irrigation will minimize irrigation season pesticide loading. Drip irrigation alone will not drive loading to its minimum. More correctly, drip irrigation would essentially eliminate pesticide runoff from treated sites during the irrigation season.

Response to Comment 3: The sentence has been revised for clarification.

Comment 4: *Page 14, paragraph 3:* Although it is clear in Tables 1.1-1.4, it would be helpful if the report's text states that the use data pertain to the lower San Joaquin Valley only.

Response to Comment 4: The relevant text has been revised to state that the Pesticide Use Report (PUR) information presented in the Tables is specific to the lower San Joaquin Valley, as shown on the map in Figure 1.1.

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Comment 5: *Page 29, paragraph 2 under “8.”*: This paragraph describes how prohibitions of discharge would be applied when water quality objectives, loading capacity, or load allocations are exceeded in the San Joaquin River. As proposed, prohibitions apply upstream from monitoring sites where exceedances occur. This seems to unduly regulate dischargers in subareas where water quality indicators may be in compliance. Under these circumstances, it would be justifiable if the prohibition only applies to that group of subareas and not to subareas farther upstream. We recommend that the text be revised to reflect that prohibitions of discharge only apply to subareas or tributaries that contribute enough diazinon, chlorpyrifos, or both, to cause exceedances in the San Joaquin River.

Response to Comment 5: The amendment language cited in the comment has been revised to clarify that the prohibition will apply only to the subarea(s) where water quality objectives, loading capacity, or load allocations have been exceeded, and not to subareas upstream of those subareas, if no exceedances have been observed in those upstream subareas. It should be noted that the conditional prohibition of discharge only applies to dischargers whose discharge is not governed by waste discharge requirements or a conditional waiver of waste discharge requirements. Since the discharge of waste must be governed by WDRs or a waiver of WDRs, the only dischargers to whom this prohibition would apply are those already not in compliance with Porter-Cologne.

Comment 6: *Page 29, paragraph 2 under “8.”*: The primary goal of the orchard pesticide runoff program and the diazinon runoff control program should be, as stated in element 1 of “Diazinon and Chlorpyrifos Runoff in the San Joaquin River Basin,” to “ensure compliance with water quality objectives applicable to diazinon and chlorpyrifos in the San Joaquin River” The Regional Board should use water quality objectives as the primary means for determining protection of beneficial uses. Load capacities and load allocations should not have equal regulatory stature as water quality objectives, particularly when determining whether to institute a severe regulatory approach such as a prohibition of discharge. In the event that objectives are violated, load allocations should provide additional regulatory tools to help identify specific watersheds where additional action may be warranted. Also, it is conceivable that a tributary can exceed its load allocation, yet the San Joaquin River has enough capacity to dilute high incoming concentrations such that water quality objectives in the river are met. The trigger for regulating discharges in tributary’s watershed should be exceedance of water quality objectives for the tributary. We recommend that the text be amended to reinforce the concept that the overall goal is attainment of water quality objectives and that load allocations may be used to refine responses to violations of objectives.

Response to Comment 6: The amendment language has been revised in the appropriate sections to emphasize compliance with water quality objectives and loading capacity and

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to use load allocations to refine responses to violations of the objectives (e.g. prohibitions only applying to subareas not meeting their allocations).

Comment 7: *Page 30, general comment for the proposed implementation plan:* The proposed implementation plan for diazinon and chlorpyrifos runoff in the San Joaquin River Basin includes many references to loading capacity and load allocations, some in a regulatory context. Definitions for these terms, however, are not proposed for inclusion in this implementation plan. (Note that these loading capacity and load allocation are defined elsewhere in the Basin Plan under *Orchard Pesticide Runoff and Diazinon Runoff into the Sacramento and Feather Rivers*, but those definitions are inconsistent with the apparent intent of this proposed action.) To avoid confusion and to make clear the Regional Board's intent, we recommend that definitions, consistent with those described in the staff report, be included in the Basin Plan amendment.

Response to Comment 7: These definitions can be found in the Basin Plan (2004 4th edition) in Chapter IV Implementation, section 4. Water Quality Limited Segments Policy, Page IV.15.00

Comment 8: *Page 30, number 3:* See comments for Page 29, paragraph 2 under "8."

Response to Comment 8: Page 30, number 3 refers to the implementation of the water quality objectives and allocations through waivers of waste discharges requirements (WDRs), or general or individual WDRs. See response to Comment 6.

Comment 9: *Page 30, number 6:* There may be situations where in-stream conditions exceed a toxic unit value of 1.0, but they may not be measurable. For example, when the concentration of diazinon is very close to its target, a very low concentration of chlorpyrifos is all that is needed for the toxic value to exceed 1.0. However, such low concentrations of chlorpyrifos may be below the limit of quantitation for the laboratory methodology. We are not offering a solution at the time; we only want to point out how sometimes it may be difficult to determine compliance.

Response to Comment 9: The proposed Amendment defines non-detectable concentrations as zero. The point raised by the Commenter is an issue of which the Central Valley Water Board is aware and will take into consideration when reviewing monitoring programs associated with the Amendment.

Comment 10: *Page 31, number 7:* This provision states that "the Regional Board shall require . . . additional reductions in diazinon and chlorpyrifos levels necessary to . . . protect beneficial uses in tributary waters." Given recent efforts to better define "tributary waters" and the "tributary rule," the proposed amendment should provide a more robust explanation of where diazinon and chlorpyrifos levels must be reduced,

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consistent with recent interpretations and clarifications of the tributary rule. Perhaps a suitable revision to provision number 7 might read, “. . . protect beneficial uses in tributary waters, consistent with Central Valley Regional Water Quality Control Board Resolution No. R5-2005-0105.”

Response to Comment 10: Existing policies that are applicable to tributary waters will be used to protect beneficial uses in the tributaries. The proposed resolution referred to by the Commenter does not establish new Central Valley Water Board policy with respect to tributary waters, but only provides a description of existing policies and laws that is required by a Court order.

Comment 11: *Page 31, number 9:* This provision would require additional management measures if the loading capacity of the San Joaquin River is exceeded. To prevent the perpetuation of former, but ineffective, management practices, we recommend that “additional management measures” be changed to “an improved complement of management measures.”

Response to Comment 11: The report language has been revised for clarification.

Comment 12: *Page 34, Surveillance and Monitoring:* These provisions describe monitoring and surveillance requirements to monitor pesticide runoff in the San Joaquin Valley. A cornerstone of the proposed implementation plan for diazinon and chlorpyrifos runoff in the San Joaquin River Basin is element 3 on page 30: “The water quality objectives and allocations will be implemented through one or a combination of the following: the adoption of one or more waivers of waste discharge requirements, and general or individual waste discharge requirements.” This suggests that the monitoring and reporting requirements in the Basin Plan would be the same as—or at least very close to—those for the Regional Board’s Irrigated Lands Program. There are, however, differences that make it difficult to discern the extent Monitoring and Reporting Program (MRP) requirements of the Regional Irrigated Lands Program will fulfill the proposed monitoring and surveillance requirements. We recommend that the proposed amendment mirror to the extent possible the Regional Board’s other monitoring and reporting requirements. For example, the proposal could reference Regional Board Order No. R5-2005-0833, which defines objectives for the MRP, as minimum monitoring requirements. If there are additional requirements, the proposed monitoring and surveillance requirements should clearly differentiate them from the MRP requirements.

Response to Comment 12: The monitoring and reporting program that applies to Coalitions in general, specific Coalitions or individual dischargers are subject to changes that cannot be anticipated in this Amendment (e.g. the Resolution to which the Commenter referred may not govern all or even any of the agricultural discharges of diazinon and chlorpyrifos in a year or two). However it is staff’s intent to utilize any available MRP associated with the Irrigated Lands Program in the future as the mechanism for implementation of the monitoring requirements of this Amendment.

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Comment 13: *Page 34, Surveillance and Monitoring:* Additionally, since the Tulare Lake Basin is frequently considered part of the San Joaquin Valley, these requirements should be specific to the San Joaquin River *Basin*. The first paragraph of the proposed monitoring and surveillance requirements should make that clear.

Response to Comment 13: This amendment is a revision to the Basin Plan for the Sacramento and San Joaquin Basins. The Tulare Lake Basin is covered by its own separate Basin Plan, therefore no change related to this comment was made.

Comment 14: *Page 39, paragraph 7:* Please consider updating the information in this paragraph. DPR initiated the rule-making process for its proposed dormant spray regulations; the public comment period closed on August 1, 2005. Additionally, the supplemental labels for diazinon dormant sprays have been approved by DPR and are currently binding in California. Similarly, agricultural products containing chlorpyrifos also have new updated labeling, which include requirements and advisories for protecting water quality. Those labels are currently under review at DPR.

Response to Comment 14: The report has been revised to reflect the suggested updates.

Comment 15: *Page 47, paragraph 5:* This paragraph begins by stating that the Basin Plan states that the Regional Board will use one tenth of the 96-hour LC50 or the most sensitive organism to interpret the narrative water quality objectives when numeric objectives or criteria are not available. In fact, the Basin Plan states that “. . . the Regional Board will use the best available technical information to evaluate compliance with the narrative objectives. Where valid testing has developed 96 hour LC50 values for aquatic organisms . . . , the Board will consider one tenth of this value for the most sensitive species tested as the upper limit . . . for the protection of aquatic life.” We believe that the term “will consider” was purposefully amended into the Basin Plan rather than “will use” to preserve flexibility. . . . We recommend that when water quality criteria are not available, the Regional Board “consider” all reasonable information when evaluating values that indicate compliance with narrative objectives, not only one tenth of the lowest LC50 value.

Response to Comment 15: The report has been revised to replace “will use” with “will consider”.

Comment 16: *Page 67, last paragraph (continuing on page 68):* The report notes that the recommended loading capacity is concentration-based, yet equation 6 expresses a mass-based loading capacity. To avoid confusion, equation 6 should be revised to be the same as equation 1 on page 65, which is presented as an expression of a concentration-based loading capacity.

Response to Comment 16: Equation 6 has been revised to be expressed as a concentration-based loading capacity, as shown in Equation 1.

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Comment 17: *Page 72, paragraph 3:* We recommend that the report mention and reference a recent revision of the University of California Statewide Integrated Pest Management Program's recommendations for pest management in almonds. This revision represents the most authoritative compilation of information for pest management decision-making in almonds. If followed, these recommendations could substantially reduce almond growers' reliance on conventional pest management practices. The on-line version of the recommendations can be found at <<http://www.ipm.ucdavis.edu/PMG/C003/m003yi01.html>>. Similar revisions are currently under way for pest management in stone fruits.

Response to Comment 17: The staff report has been revised to include this information.

Comment 18: *Page 72, section 4.4.12:* This section discusses management practices, described in two draft Regional Board reports, that "are likely to be effective in reducing offsite movement of diazinon and chlorpyrifos into surface water." It is important to note that few management practices have been demonstrated under California conditions, and with pesticides commonly used in California, to reduce pesticide runoff. After all, this is presumably the basis for proposed monitoring requirement 4 (page 34). Currently, projects are planned or under way in California to demonstrate and quantify the effectiveness of several management practices including upgraded sprayer methodology, vegetated buffers and waterways, constructed wetlands, and the use of polyacrylamide calcium. We recommend that the report reflect that while some management practices may show potential, the degree to which they may help reduce diazinon and chlorpyrifos runoff has not been quantified.

Response to Comment 18: While the management practices described in the referenced reports have not all been tested in California, they have undergone extensive testing by the Natural Resources Conservation Service (NRCS) in other agricultural areas, and have been demonstrated to be successful in reducing pesticide runoff. Some have specifically been shown to reduce chlorpyrifos runoff. As the comment notes, these practices are currently undergoing testing in California and additional information will be available after these tests are completed. The statement that these practices "are likely to be effective in reducing offsite movement of diazinon and chlorpyrifos into surface water" is believed to be accurate, based upon the existing available information discussed in detail in the referenced reports.

Comment 19: *Page 81, section 4.6.:* As recommended in an earlier comment, the surveillance and monitoring requirements should take advantage of the monitoring and reporting requirements of the Irrigated Lands Program to the greatest extent possible. We recommend that the staff report describe the extent those monitoring and reporting requirements can help satisfy proposed surveillance and reporting requirements.

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Response to Comment 19: The implementation of this Basin Plan amendment is anticipated to parallel the implementation of the Sacramento-Feather River Basin Plan amendment. The surveillance and monitoring requirements of the Sacramento-Feather River amendment are currently in the process of being incorporated into the Irrigated Lands Program monitoring for the Sacramento Valley Water Quality Coalition. The Central Valley Water Board will need to review the specific monitoring programs of the relevant coalitions in the San Joaquin Valley to determine the extent to which changes in those monitoring efforts will need to be made to meet the requirements of this Amendment.

Comment 20: *Figures 1.8, 1.12, and 1.13:* Combined toxicity values above 1.0 are not necessarily toxic. A value of 1.0 represents a compliance point for the toxicity water quality objective, which is derived as the sum of the concentrations of diazinon and chlorpyrifos, divided by their respective numeric target or water quality objective. Since the numeric target and objective are protective in nature—not equivalent to a toxicity threshold—it is incorrect to state that data points above 1.0 are toxic. DPR recommends that the text on these figures be amended with appropriate qualifications so that toxicity values above 1 are not necessarily equated with toxic conditions.

Response to Comment 20: The report has been clarified to state that combined toxicity values greater than 1 represent non-compliance with the additive toxicity formula.

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6. William J. Thomas, on behalf of Bryan L. Stuart, Ph.D., Government Relations Manager, Dow AgroSciences LLC

Comment 1: Page 14/15: Sections 1.2.2 and 1.2.3: Chlorpyrifos use has dramatically reduced in urban use (as a result of DAS removing such uses from the label) and has also reduced in agricultural use due to new label restrictions, new management practices and agricultural pest control use changes. The Basin Plan document, itself indicates “chlorpyrifos use...has declined significantly since 1995,” and “from 1995 to 2002, chlorpyrifos use decreased by 26% in almonds, 91% in cotton and 64% in alfalfa.”

Response to Comment 1: No change to report recommended.

Comment 2: Page 36: Section 3.1: DAS supports the statements that the appropriate watershed policy should be to implement a watershed-based approach with participation of stakeholders and direct focus on the most important water quality problems.

Response to Comment 2: The Central Valley Water Board appreciates DAS’s support. No change to report recommended.

Comment 3: Page 39: Section 3.2: DAS supports reliance on the Management Agency Agreement between the Water Boards and Department of Pesticide Regulation.

Response to Comment 3: The Central Valley Water Board appreciates DAS’s support. No change to report recommended.

Comment 4: Page 40: Section 3.2: DAS supports having the Basin Plan/TMDL satisfy the requirements of the Bay Protection Toxic Hot Spot clean-up program. Chlorpyrifos is listed as a Toxic Hot Spot in only four limited agricultural drain segments and these listings were based on historic data, and because agricultural chemical use and chlorpyrifos use have been changing, the transient nature of the events monitored are not likely to be relevant any longer.

Response to Comment 4: The Central Valley Water Board appreciates DAS’s support. This Basin Plan amendment satisfies the requirement of the Bay Protection Toxic Hot Spot Cleanup Program to develop a Basin Plan Amendment for the San Joaquin River. The four locations referred to in the comment are in the Delta, and out of the geographic boundary of this Basin Plan Amendment. They will be addressed in a subsequent amendment.

Comment 5: Page 44 through Page 50, Section 4.3.1. and Table 4.1, page 147 re Water Quality Objectives: Nowhere in this section is there a justification for

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selecting the CDFG chlorpyrifos criteria instead of the final chlorpyrifos US EPA ambient water quality criteria. The CDFG criteria are more protective, but Staff does not explain why greater protection is necessary relative to the US EPA criteria. Both were calculated using US EPA Water Quality Criteria methodology, but only the final chlorpyrifos US EPA criteria underwent public notice and comment procedures. Consideration of new *Ceriodaphnia dubia* toxicity data in calculating the criteria, as was done by CDFG, does not result in an improved criterion relevant to protecting California water bodies, as *C. dubia* is not an important component of the lotic freshwater invertebrate community in the State. However, this species is very sensitive to chlorpyrifos and serves to drive down the criteria values relative to the final US EPA criteria. DAS asserts that if numerical Water Quality Objectives (“WQOs”) are to be set for chlorpyrifos that should also be the case for diazinon. DAS’ interest is exclusively chlorpyrifos and diazinon is solely the business of Makhteshim Agan of North America, Inc. (“MANA”); however, because this amendment proposes to impose standards based on additivity of both materials, we do have an interest in the Basin Plan having parallel and equal status objectives for each chemistry. In that regard, we believe MANA is submitting adequate information for the Board to implement a WQO for diazinon and we support the Board’s setting a diazinon WQO consistent therewith.

Response to Comment 5: The U.S. EPA water quality criteria were developed in 1986. The CDFG criteria are more recent (2000), and include additional toxicity studies, such as those on *Ceriodaphnia dubia*, as noted in the comment. Toxicity studies used in criteria derivation often serve as surrogates for species that may or should be present in natural freshwater systems. Such an approach is necessary, since it is not always possible to develop viable testing protocols for all species of interests. The Commenter has not provided evidence to suggest why *C. dubia* are not an important part of the freshwater invertebrate community or why *C. dubia* would not be representative of other freshwater invertebrate species that would be present in the absence of elevated levels of diazinon and chlorpyrifos.

With respect to criteria review, the CDFG criteria went through agency review by staff from the California Department of Pesticide Regulation, the Central Valley Water Board, and U.S. Environmental Protection Agency prior to their publication. The report has been revised to provide additional justification for the selection of the CDFG criteria for chlorpyrifos.

With respect to the comment regarding adoption of diazinon water quality objectives, the Central Valley Water Board staff have changed their recommendation and are proposing the adoption of diazinon water quality objectives. The report and Basin Plan amendment have been revised to recommend adoption of the CDFG water quality criteria as water quality objectives.

Comment 6: Page 55: Section 4.3.1: Additive Toxicity With respect to the additive toxicity policy, the use of water quality criteria in the denominator of the terms added together to obtain a sum of toxicity is not supported by any known published study or

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US EPA guidance. This procedure is highly suspect, as it combines values based on differing numbers of tests conducted on different species that are then adjusted by application of a safety factor prior to being used in the additive toxicity formula. Selecting comparable Genus Mean Acute Values would be a more reasonable choice.

Response to Comment 6: Staff used the method of evaluating additive toxicity that is current policy in the Basin Plan. As shown in the staff report (see Section 4.4.6, page 68, paragraph 3) and in Appendix E, this method is mathematically identical to the chlorpyrifos toxic equivalents method suggested by the peer reviewer.

Comment 7: Page 58: Section 4.3.4: DAS agrees that the improvements in residue levels over recent years, coupled with a modestly amended Basin Plan will be effective in improving water quality to protect beneficial uses of water of the Region so long as there is reasonable lead time to implement its terms.

Response to Comment 7: No change to report recommended.

Comment 8: Page 71/74: Section 4.4.11: DAS concurs that management practices and use restrictions have resulted in important improvements in water quality and with increased implementation and refinement, they will achieve adequate load allocations in the future.

Response to Comment 8: The Central Valley Water Board appreciates DAS's concurrence with staff's analysis. No change to report recommended

Comment 9:Page 77 – 80: Section 4.4.15: These pages discuss establishing a compliance deadline, however, the draft inappropriately selects 2008, rather than the more reasonable and practical date of 2013 as the deadline. There is no advantage in setting an unreasonable deadline. This Basin Plan will not even be final until late 2006, thereby making 2007 the first fully implementable year. A deadline two years thereafter deadline is inappropriate and unreasonable. Furthermore, premature deadlines that do not allow for well considered solutions will likely result in pesticide substitution decisions outside the context of Integrated Pest Management that could lead to comparable or more significant water quality concerns.

Response to Comment 9: Staff expects improvements to continue, based upon label changes and increased outreach and education regarding best management practices, and increased implementation of effective management practices. The Central Valley Water Board agrees that some additional time is appropriate to allow for changes in applicable monitoring programs required by this Amendment and for the implementation of any additional practices that are necessary to comply. The amendment has been revised to provide two additional years before the compliance dates become effective in 2010.

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Comment 10: Page 98-99: Section 5: This section analyzes the projected annual cost of compliance with the aggressive components of the TMDL/Basin Plan amendments. The analysis states: “The basinwide combined costs of alternative pest management practices, alternative water management practices, and monitoring and compliance activities for the major crops that use diazinon and chlorpyrifos are estimated to range from \$0.6 million to \$20 million. 2004 dollars were used and no adjustments were made for inflation.”

These annual costs are extraordinary and reflect that there are extensive and excessive components of these amendments. On Page 98, the report suggests such costs would be addressed by bonds, surcharges, taxes, fees, appropriations from the Legislature, and land retirements. These are extreme and perhaps impossible to implement measures which also reflect the extensiveness of some of the provisions and timelines.

Response to Comment 10: These cost estimates are conservative towards the high end because they assume that no management practices are already being implemented. They do not reflect the increases in the use of management practices that are already occurring. Even with these conservative estimates, if dischargers choose to minimize their costs through participation in a watershed coalition, individual costs for monitoring, planning and compliance activities are estimated at \$600/year. In addition, these costs also duplicate some of the costs (e.g. monitoring) that are already required, or will be required, for compliance with the new CDPR dormant spray regulations and labels, the Irrigated Lands Conditional Waiver, and other Basin Plan amendments pertaining to the lower San Joaquin River. Finally, millions of dollars of federal and state grant funding have already been provided for the improvement of water quality that is impaired by agricultural discharges. Many of these funds are targeted toward the implementation of management practices (i.e. improved application equipment, vegetated buffer strips) to reduce or eliminate diazinon and chlorpyrifos discharges.

Comment 11: Page 129: Figure 1.7: In Figure 1.7 of the Draft Staff Report (attached), it is clear that for the period 1996 through 2005, there is no more than one exceedence of the US EPA acute criterion of 0.083 µg/L. Therefore, by this objective no water quality impairment is indicated.

Moreover, the monitoring data come from grab samples extracted by the liquid-liquid partition (LLP) method using an organic solvent such as methylene chloride.¹ Because the sample is not filtered or centrifuged before extraction, the solvent strips chemical from any suspended particulates that may be present, as well as from dissolved organic carbon (DOC). As a result, the reported concentration represents the sum of the following three fractions: that truly dissolved in the river water, that sorbed to suspended particulates, and that associated with DOC. Because only the truly dissolved fraction is comparable to the conditions used in standard laboratory toxicity testing, comparison of the monitoring results obtained by LLP with a water quality criterion based on laboratory testing is not correct, as it overestimates the bioavailable fraction that could result in impaired water quality.

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As reported in a recent peer reviewed journal article, Southern California creek water spiked with bifenthrin and permethrin had greatly differing measured concentrations using standard LLP and solid phase microextraction (SPME) with no centrifugation.

The authors' interpretation of these data is that LLP extracts from water, DOC, and suspended sediment, while SPME samples only from water. This is the true bioavailable fraction that can cause toxicity. The addition to the table suggests that reported bifenthrin and permethrin water/organic carbon partition coefficients can be scaled by a factor of 137. Using average Koc values for bifenthrin, 237000, permethrin, 277000,³ (mean = 257000) and chlorpyrifos, 8498,⁴ an estimate of a comparable bioavailability measurement factor for chlorpyrifos can be calculated.

Assuming the San Joaquin River grab samples contain comparable amounts of suspended particulates and DOC, then the concentrations in Figure 1.7 can be divided by a factor of 4.5 to express the value that should be compared against the acute numeric criterion. After adjusting data reported in the figure by the factor of 4.5 it is apparent that for the period 1996 through 2005, there is no exceedence of either the US EPA acute criterion of 0.083 µg/L or the CDFG acute criterion of 0.025 µg/L. For the entire period of record, 1991-2005, there may be only one reported exceedence of either criterion. Based on all of the preceding considerations, there is insufficient evidence to amend the basin plan as proposed in the Draft Staff Report.

Response to Comment 11: The Commenter is correct in the observation that toxicity tests used to develop criteria are generally conducted in laboratory water that has a limited amount of suspended material (e.g. the food for the organisms). The amount of suspended material in the laboratory tests would generally be less than that found in a natural waterbody. This observation does not provide evidence that only dissolved chlorpyrifos in the water column is bioavailable. In addition, there is no scientific evidence provided for equating the ratios of Koc values for pyrethroids to chlorpyrifos with their relative bioavailability.

If the Commenter would like to develop the scientific data necessary to evaluate bioavailability of chlorpyrifos, Central Valley Water Board staff will work with the Commenter to ensure their studies can be used in considering revisions to the chlorpyrifos water quality objective. The Central Valley Water Board can consider such information when it reviews the program of implementation in 2009, which is one year prior to the compliance date.

Comment 12: Figure 17: Even though this chart and Figure 1.8 reflect an inappropriate target level (see above and pages 3/4) and the data is not appropriately standardized (see above), additional analysis is merited. The charts reflect historic data back to 1991. During the five-year period from 1991 to 1995, only 21 data points exceeded the 0.025 µg/L level and 64 data point did not exceed this level. It is also important to recognize that 1006 samples showed no residual at all. Therefore, less

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than 2% of the samples exceeded these extremely low target levels. During the 10-year period from 1996 to 2005, only 10 data points exceeded the target level and 142 data points were below this level. This clearly indicates both a tremendous improvement and that very few excessive points (only four data points since 2003) exist, and these exceeded the 0.025 µg/L level, only by a few thousandths of a µg/L. Even though this is an inappropriately low target level and inconsistent with U.S. EPA, this appears to be very manageable over the next several years.

Response to Comment 12: Staff appreciates the concurrence of DAS that improving water quality to meet water quality objectives appears to be very manageable over the next several years.

Comment 13: Page 130: Figure 1.8: Similarly, Figure 1.8 charted the occurrences having both chlorpyrifos and diazinon. This chart similarly shows, from 2000 to 2005, only 24 data points slightly exceeded the toxicity unit line of 1, whereas hundreds of points were below the toxic level, and 650 points were non-detectable whatsoever. These data represent very improved residue levels which indicate that industry-driven Best Management Practices (“BMPs”) are effective and that they must also continue, and that little additional regulatory efforts will be required to make this an effective TMDL.

Response to Comment 13: See previous response to Comment 12.

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Response to Scientific Peer Review Comments

The following discussion presents a summary of peer review comments received from Allan Felsot, Professor, Entomology and Environmental Toxicology, Washington State University, Richland, WA. Staff responses are presented following each comment. Comments were provided on the “Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Diazinon and Chlorpyrifos Runoff into the Lower San Joaquin River; Peer Review Draft Staff Report ; February 2004 (sic – 2005)”

Issue 1: Is the proposed rule based upon sound scientific knowledge, methods and practices when it relies on the use of the California Department of Fish and Game’s (CDFG) chlorpyrifos water quality criteria document as the basis for site-specific water quality objectives?

Comment summary:

CDFG was transparent in its derivation of the proposed WQ criteria and they faithfully followed the EPA 1985 Guidance document.

Many aquatic toxicology studies have thus far concurred that Cladocerans (specifically the species *Ceriodaphnia dubia*) are the most susceptible organisms to acute toxicity by diazinon and chlorpyrifos. Given the range of concentrations posted in Appendix C of the report and the general trend for reductions in diazinon and chlorpyrifos use and residue detections, the proposed CDFG WQ criteria should be adequately protective.

The EPA risk characterization method can be used to validate the derivation of the CDFG WQ criteria.

EPA uses a deterministic Risk Quotient (RQ) approach (ratio of exposure concentration to toxicity endpoint) to determine if exposure exceeds their levels of concern (LOC). A five-fold safety factor is applied to the acute toxicity endpoint. This approach results in an LOC of 0.02 µg/L that is virtually the same concentration as the CDFG criterion.

With the EPA RQ approach, a similar analysis to that used for chlorpyrifos can be applied to the proposed diazinon criterion to determine its validity. EPA (1999) considered the scud (*Gammarus fasciatus*) to be the most susceptible invertebrate exhibiting an LC50 of 0.2 µg/L. Application of the equivalent 5-fold safety factor indicates that any diazinon residues greater than 0.04 would exceed EPA’s LOC. Thus, the proposed criterion of 0.16 µg/L is within a factor of ~4. The 21-day NOAEC in a chronic toxicity assay with *Daphnia magna* was 0.17 µg/L. This concentration is about twice as high as the 4-day WQ criteria proposed in the TMDL plan.

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Reliance on the CDFG WQ criteria would give a degree of protection that seems reasonably validated by EPA's ecological risk characterization approach.

Response: Since the peer reviewer agrees that the use of the California Department of Fish and Game's (CDFG) chlorpyrifos water quality criteria document as the basis for site-specific water quality objectives is appropriate, no changes regarding the derivation of the chlorpyrifos criteria will be made to the draft report. The Staff Report reflects slight changes in the proposed chlorpyrifos objectives, which are based on the application of the U.S. EPA methodology employed by CDFG.

The results of the *Gammarus fasciatus* diazinon study referred to by the reviewer could not be verified, and are not considered for use in determining a water quality target or objective. Staff recalculated the diazinon criteria using the remaining CDFG dataset, after removing the results of the questionable study, to determine appropriate diazinon water quality objectives. Refer to Section 4.3 and Appendix E.

Issue 2: Use of a toxic unit formula for the loading capacity and allocation to account for the additive effects of diazinon and chlorpyrifos.

Comment Summary:

The formula proposed for determining whether the load capacity of simultaneously occurring residues of diazinon and chlorpyrifos exceeds the water quality criteria does not reflect additive toxicity. The formula is divorced from measurement of toxicity by virtue of the false assumption that residues at the water quality standard, which has a 2-fold uncertainty factor built in, are linearly related to toxicity. The interactive response to simultaneous exposures of diazinon and chlorpyrifos residues is likely neutral when the concentrations are below a threshold for any effect. Assuming that all concentrations are additive is not valid when they are below a certain threshold of response. The application of the formula for calculating toxicity units to account for additive effects is inconsistent with other determinations of joint toxicity from residues of compounds having different potencies. The denominator in these formulas has to be based on a definitive toxicity endpoint, not a value that already includes a safety factor. The formula should be based on either the LC50 for the most sensitive species or a potency factor. To estimate the combined residues, all residues should be expressed as an equivalency of a chosen reference compound. Choosing chlorpyrifos toxicity equivalences is logical considering that chlorpyrifos residues may contribute the most toxicity at locations such as SJR at Vernalis.

One solution to the dilemma of cumulating exposure to two or more compounds with the same biochemical mode of action is to normalize the potency of all residues. For example, if the potency of both diazinon and chlorpyrifos were known, then all diazinon residues could be transformed into chlorpyrifos equivalent residues. The ratio of potencies constitutes a relative potency factor (RPF). The ratio of FAVs can be used to calculate the RPF:

$$\text{RPF} = \frac{\text{FAV}_c}{\text{FAV}_d} = \frac{0.05}{0.32} = 0.15625$$

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FAVd 0.32

Diazinon residues are changed into chlorpyrifos equivalents residues by multiplying all concentrations of diazinon by 0.15625. The resulting chlorpyrifos equivalent residues are added to the measured chlorpyrifos residues to determine if the daily load has been exceeded.

Use of the RPF approach to make a decision about exceedance of WQ criteria is illustrated in Table 1 using part of the residue dataset presented in Appendix C. Table 2 show the likely management decision based on the “joint toxicity” formula presented in Karkoski et al. (2004). The management decision regarding whether the loads have been exceeded are virtually the same, but the use of the RPF method would be on sound toxicological footing that is consistent with other exposure assessments that have been used for mixtures of compounds having identical biochemical modes of action.

Table 1. Illustration of the calculation of chlorpyrifos toxic equivalent residues for determining exceedance of the loading capacity when diazinon and chlorpyrifos co-occur.

Date	Time	Agency	Diazinon	Chlorpyrifos	Total Chlorpyrifos Toxic Equiv.	Exceed 1 hr?	Exceed 4 day?
08/04/93	10:15	USGS NAWQA-4	0.09	0.012	0.026	Yes	Yes
08/25/93	19:00	USGS NAWQA-4	0.026	0.008	0.012	No	No
02/13/00	5:30	USGS-CVRWQCB	0.075	0.012	0.024	No	Yes
02/13/00	12:00	USGS-CVRWQCB	0.03	0.012	0.017	No	Yes
02/13/00	23:00	USGS-CVRWQCB	0.036	0.005	0.011	No	No

Table 2. Illustration of the S (sums of ratios method proposed by Karkoski et al. 2004) to determine exceedance of the loading capacity when diazinon and chlorpyrifos co-occur.

Date	Time	Agency	Diazinon $\mu\text{g/L}$	Chlorpyrifos $\mu\text{g/L}$	1-hr Sum of Ratios (S)		4-day Sum of Ratios (S)	
					1 hr	Exceed?	4 day	Exceed?
08/04/93	10:15	USGS NAWQA-4	0.09	0.012	1.0	No	1.8	Yes
08/25/93	19:00	USGS NAWQA-9	0.026	0.008	0.5	No	0.8	No
02/13/00	5:30	USGS-CVRWQCB	0.075	0.012	0.9	No	1.6	Yes
02/13/00	12:00	USGS-CVRWQCB	0.03	0.012	0.7	No	1.2	Yes
02/13/00	23:00	USGS-CVRWQCB	0.036	0.005	0.4	No	0.7	No

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Response: The peer reviewer states that the additivity formula used in the draft staff report does not reflect additive toxicity. The peer reviewer presents an alternative method for calculating additive toxicity (Toxic Equivalents method), and states that this alternative is consistent with other exposure assessments (i.e. US EPA) that have been used for mixtures of compounds having identical modes of action.

Staff compared the Toxic Equivalents method to the additivity formula in the Basin Plan and found the methods to be mathematically identical. Results of this comparison are provided in Appendix E of the staff report. Staff also used the Toxic Equivalents method to calculate additive toxicity in the report, using water quality data collected between 1991 and 2005 (see Section 1.2). The results of staff's calculation of the Relative Potency Factor are slightly different from those of the peer reviewer and are provided in Appendix E.

It should also be noted that the use of the additivity formula in the Basin Plan is not meant to predict a specific toxic response in a specific organism, but is meant to ensure that the presence of pollutants that act in an additive fashion do not cause a toxic response to aquatic organisms. If multiple pollutants that act in an additive fashion are only compared to their individual objectives, then the cumulative effect of those pollutants when they co-occur would not be addressed. The alternative to use LC50s in the denominator of an additivity formula could be applied to predict an effect, but would not be appropriate to use to establish the Loading Capacity, which is meant to be protective of aquatic life.

Staff recommends the use of the additivity formula in the Basin Plan for the following reasons:

- There is no practical difference in the management outcomes of the two methods
- The additivity formula is already in the Basin Plan
- If water quality objectives for diazinon or chlorpyrifos are changed, the additivity formula will allow incorporation of the new objective, while the Toxic Equivalents method requires recalculation of the RPFs.

Issue 3: Use of different diazinon water quality targets to account for invertebrate versus salmonid impacts.

Comments presented in full:

Karkoski et al. (2004) point to the paper by Scholz et al. as evidence that the proposed diazinon water quality criteria may not be adequately protective of salmon, especially when sublethal effects are considered. At one point in the amendment report, Karkoski et al. (2004) seem to treat the lowest diazinon concentration tested by Scholz et al. (0.1 µg/L) as a LOAEC (p. 55, "...effects of diazinon have been observed at levels as low as 0.1 µg/L; p. 55, "The work by Scholz et al....suggests a possible lowest observed adverse effect level to Chinook salmon of 0.100 µg/L."). Elsewhere, 0.1 µg/L is viewed as a NOAEC (p. 56, "The study by Scholz [2000]

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suggests that if diazinon levels do not exceed 0.100 µg/L, then salmon should be protected; p. 56, "...the 0.100 µg/L should be considered an instantaneous maximum..."). Critical examination of Scholz et al. 2000 shows the 0.1 µg/L to be an empirical concentration wherein no statistical difference (at $p \leq 0.05$) in behavioral endpoints (food strikes or swimming activity) was observed in exposed fish compared to the non-dosed control fish. Thus, the concentration 0.1 µg/L was an empirical NOAEC in the Scholz et al. (2000) study. However, the value of using 0.1 µg/L as a guide is dubious for the following reasons.

First, examination of the highest dose tested (10 µg/L) by Scholz et al. (2000) suggested that the behavioral endpoint of swimming activity cessation in response to an alarm pheromone did not differ significantly between unexposed and exposed fish. Thus, there was no linear dose-response effect, as would be expected from an anticholinesterase mechanism of action. For the other behavioral endpoint, food strikes per unit time, the concentrations of 1 and 10 µg/L did not differ from one another, again illustrating an endpoint that showed no clear dose-response effect. Indeed, on average, fewer food strikes were observed in fish exposed to 10 µg/L than in fish exposed to 1 µg/L.

Second, the ecological relevance of the endpoints chosen remains unclear. The behavioral endpoints are not an all-or-none-effect but a gradient of possible responses when the test salmon were exposed to their alarm pheromone. Indeed, unexposed fish also made "wrong" behavioral responses (i.e., swimming activity and food strikes continued, albeit at a lower rate), and the quantitative responses of exposed fish were not largely different from the responses of the unexposed fish. The magnitude of the observed endpoints should be examined relative to the normal response in the absence of alarm pheromone. In all cases, the expected response by all exposed fish was significantly different after alarm pheromone presentation in comparison to before pheromone presentation. In other words, both exposed and unexposed fish stopped swimming and engaging in food strikes in response to the pheromone. The behavior exhibited by the middle dosed group was at best modestly different than the behavior of the lower and higher dosed group. In sum, using behavioral toxicity based on the Scholz et al. (2000) study as the basis of a water quality criterion is presently inappropriate owing to a poor quantitative separation of responses.

Third, if there is indeed a behavioral effect associated with 1 µg/L diazinon, it is not clear that the mode of physiological action is due to inhibition of acetylcholinesterase. The possible binding of diazinon to a key olfactory receptor cannot be discounted. Sandhal et al. (2002) alluded to the hypothesis of a biochemical mechanism different than acetylcholinesterase inhibition. Thus, at this time, the observations of Scholz et al. (2000) cannot be put into the context of indirect effects owing to toxicity at lower trophic levels of the food web nor analogized to toxicity due to inhibition of acetylcholinesterase. More research is needed before attempting to incorporate behavioral toxicity into water quality objectives.

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Fourth, an earlier study (Moore and Waring 1996) on the effects of diazinon on impairment of response of the olfactory rosette in Atlantic salmon suggests a NOAEC of 5 µg/L when overlapping 95% confidence intervals are examined (Felsot 2001). The study by Moore and Waring (1996) can be related to the Scholz et al. (2002) study because sex and alarm pheromones are first sensed by the nervous tissue of the rosette. Moore and Waring measured electrical recordings in the rosette in vivo while stimulating it with female sex pheromone. In summary, evidence from a second study suggests that not enough information is known about sublethal effects on pheromone-mediated behaviors to set a criterion specifically for salmon.

In conclusion, reliance on the Scholz et al. (2000) paper for a “special” water quality standard that protects salmon lacks validity. Reliance on behavioral toxicity endpoints based on the Scholz et al. (2000) study is presently inappropriate owing to a poor quantitative separation of responses. Minimal absolute differences occurred between diazinon treatments, and no clear dose-response relationship existed among all diazinon exposure concentrations. Furthermore, compared to normal behavioral responses in the absence of an alarm pheromone the exposed salmon at all diazinon concentrations reacted as expected by significantly ceasing swimming and food strike behavior. Finally, the behavioral endpoint seems to have ambiguous ecological relevance to protecting water quality in the SJR Basin. Instead, the most sensitive endpoint for protecting water quality in the SJR remains invertebrate toxicity. Invertebrate toxicity is based on many species responses, the final criteria are probabilistic in nature, and mortality is a definitive endpoint and an appropriate benchmark for rapidly reproducing species at the lower trophic levels.

Response: The reviewer’s primary criticism of staff’s use of a behavioral toxicity endpoint for salmon is that there are insufficient data currently available to serve as the basis for establishing a water quality target for diazinon based on behavioral effects.

Previous comments provided by NOAA Fisheries during the development of the diazinon Basin Plan Amendment for the Sacramento and Feather Rivers indicated that agency’s concern that the proposed diazinon water quality objectives (acute = 0.050 µg/L, chronic = 0.080 µg/L) were below the lowest noted effects levels found in the literature, although not by a great margin, and that the objectives should be protective if diazinon was the only stressor present in the system. In the San Joaquin River, it has been confirmed through extensive water quality monitoring efforts that diazinon is not the only stressor of the same chemical class present.

Staff recognizes that in this case the available scientific data are not as extensive as desired to establish a diazinon water quality objective or target based on the Scholz study, therefore no salmon-based diazinon water quality objectives or targets are being proposed at this time.

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Comments on Overarching Questions

Comment #1:

The published literature contains several studies wherein toxicity of field-collected water from the SJR Basin were determined against *Ceriodaphnia* and split samples were used to assess either diazinon or chlorpyrifos concentrations. These kinds of studies are useful for validating the likelihood that the proposed WQ criteria (i.e., daily loads) are likely to be protective enough. However, the published studies cover water samples collected circa 1993-1995. Are there any current studies of combined toxicity assessment and residue analysis? Given that the levels of chlorpyrifos and diazinon seem to be declining and detected less frequently during the 2000's than during the 1990's, a current perspective on toxicity would be very useful.

Response to Comment 1: The studies referred to were conducted because at that time (1993-1995) there were no available toxicity criteria for diazinon or chlorpyrifos, and toxicity studies were very limited. Since that time, numerous toxicity studies have been evaluated by CDFG to determine the concentrations of OP pesticides that are toxic to aquatic invertebrates, and to develop water quality criteria for diazinon and chlorpyrifos. Since these criteria have been available, the type of studies performed during the mid 1990's have not been repeated.

Comment #2:

The Karkoski et al (2004) report lacked any perspective on the current status of fish and invertebrate populations in the SJR and tributaries. Some published studies from the 1990's have stated in their introductions that invertebrate abundance (and by implication diversity) has declined in the Basin waterways. However, it would be helpful to see some actual ecological monitoring data. Is there any credible evidence that invertebrate populations post 2000 are still deficient compared to pre-2000?

Response to Comment 2: Interagency Ecological Program (IEP) surveys of invertebrates and several fish species in the Sacramento-San Joaquin Delta are the best currently available information on the abundance of these organisms. Surveys conducted from 2001 to the present have shown a continuing severe decline in invertebrate populations, and in populations of striped bass, delta smelt, longfin smelt and threadfin shad. Additional background information on these surveys from the IEP was added to the report (see IEP 2004).

Comment #3:

On a related issue, how important (or relevant) are the invertebrates that were used to determine the FAV by the CDFG? The report contains no discussion of the ecological relevance of the invertebrates chosen to derive the WQ criteria.

Response to Comment 3: CDFG used species from seven families and followed standard USEPA methodology. The majority of the most sensitive invertebrates used in the development of the CDFG criteria were freshwater zooplankton. Zooplankton are typically abundant in healthy freshwater ecosystems and are primary consumers of

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phytoplankton. They provide an important food source for many larger invertebrates as well as larval fish.

Comment #4:

Regarding a related issue of ecological relevance, Karkoski et al. state that portions of the SJR are completely dry (p. 5). The whole rationale for promulgation of TMDLs for the insecticides was to mitigate adverse effects. But what could be more adverse to aquatic organisms than a portion of their habitat drying out? From the viewpoint of a thorough (and sound) scientific analysis, Karkoski et al. may want to communicate why focusing on the two insecticides for mitigation would be important in the light of the drastic habitat change on the SJR during the growing season or after.

Response to Comment 4: The flow regime of the San Joaquin River has been the subject of ongoing litigation for over 17 years and is scheduled for trial in February 2006. The proposed Basin Plan Amendment addresses the issue of contamination of the San Joaquin River by organophosphate pesticides, and is not an instrument to establish flow requirements in the San Joaquin River that could benefit aquatic organisms.

The majority of the reach addressed by this Basin Plan Amendment does contain water throughout the year. A portion of the upstream reach below Sack Dam is generally dry except under high flow conditions. For those sections of the San Joaquin River that receive discharges of diazinon and chlorpyrifos, this TMDL and Basin Plan Amendment should address any potential adverse impacts to aquatic organisms.

Comment #5:

The analysis of management practices focusing on pesticide use alternatives seems to have overlooked new classes of commercially available reduced risk insecticides/acaricides that are effective for dormant and in-season orchard pest control practices. For example, several chloronicotinyl (a.k.a. neonicotinoid) insecticides are now available and have excellent activity against Homoptera (scale insects, psylla) and some Lepidoptera. The general biochemical class known as METI (mitochondrial electron transport chain inhibitors) have excellent selectivity and are highly active as acaricides. Both of these classes of compounds are used at lower rates although they will be more expensive than the “conventional” treatments on a per acre basis.

Response to Comment 5: The purpose of providing information on alternative practices was to consider the potential cost to agriculture as required for amendments to the Basin Plan and to identify whether technically feasible methods for mitigating diazinon and chlorpyrifos impacts existed. The Staff Report already contains an extensive description of mitigation alternatives that are clearly technically feasible and the potential cost of those alternatives has been estimated. Evaluation of additional alternative pest control methods is, therefore, not necessary or required. Staff appreciates the information on additional pest control alternatives and hopes that growers pursue approaches that will minimize potential impacts to non-target organisms. As this Basin Plan Amendment is

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implemented, we will discuss the viability of these new pesticides with the Department of Pesticide Regulation, County Agricultural Commissioners, and the agricultural community.

Comment #6:

The above issues notwithstanding, I conclude that Karkoski et al. (2004) have used the best available scientific methods for proposing the water quality criteria of the individual OP insecticides diazinon and chlorpyrifos. My main concern is the use of the formula for determining the potential exceedance of WQ criteria. I don't believe the formula actually represents a toxicologically based method. Instead, adoption of a relative potency factor approach whereby all residues can be

transformed to chlorpyrifos equivalences would allow authentic cumulation of exposure. Finally, it is commendable that Karkoski et al. intend to protect endangered species like salmon by considering new toxicological endpoints. However, they have relied too heavily on the research presented in essentially one paper (i.e., Scholz et al. 2000) without a skeptical examination of its quantitative aspects. Thus, at this time a separate criterion for salmon cannot be supported by the state of the science. In short, if invertebrates are protected, all other species will be protected.

Response to Comment 6: These comments have been addressed in previous responses to Issues #2 and #3.

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Response to CEQA Scoping Comments

The following discussion presents a summary of written comments received following the 19 January 2005 CEQA Scoping meeting on the above referenced Basin Plan Amendments. California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) responses are presented following each comment.

1. David Weinberg, Wiley Rein & Fielding LLP, on behalf of Makhteshim Agan of North America (MANA) and Dow AgroSciences (DAS)

Comment 1: The companies continue to dispute the rationality of basing any Basin Plan Amendment or TMDL decisions simply on measured chemical concentrations.

Response to Comment 1: A large number of toxicity studies have been performed for chlorpyrifos and diazinon. In each of the studies, the chemical concentrations are measured and various effects on different species of aquatic organisms are observed (e.g. mortality, reproduction). When addressing specific pollutants, every criteria derivation method of which we are aware uses the results of toxicity studies to derive a chemical concentration limit. Established pollutant-specific standards are also based on chemical concentration limits. It is also our understanding that toxicity studies are used during the process of registering pesticides for use under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Under FIFRA, environmental risk assessments are typically done by comparing modeled or measured chemical concentrations of the pesticide undergoing registration to toxicity test study results. The Central Valley Water Board believes that a key component of an effective program for controlling diazinon and chlorpyrifos discharges must include a metric for determining whether chemical concentrations of diazinon and chlorpyrifos in the San Joaquin River are acceptable. The Central Valley Water Board believes the long standing use of chemical concentration to determine acceptable levels of pesticides that has been applied under FIFRA and the Clean Water Act, as well the need to determine whether chemical concentrations of diazinon and chlorpyrifos are acceptable, provide a rational basis for establishing water quality objectives and TMDLs based on chemical concentrations.

Comment 2: We also are very disappointed to see that the charts on chlorpyrifos and diazinon depicting various concentration levels failed to include many viable options with higher levels than the Department of Fish & Game levels.

Moreover, as you are well aware from prior discussions, we do not believe that “objectives” or “targets” based on the CDFA (sic) methodology, even when that methodology is based on studies that correctly report data, are appropriate to use in setting WQOs or TMDLs. This principle is equally applicable to both chlorpyrifos and diazinon.

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Response to Comment 2: Although the available alternative criteria are not all provided in the data charts, they are provided in Table 4.1 (diazinon) and 4.2 (chlorpyrifos). The historical data are compared to the criteria in Table 4.4. The criteria development methodology was established by the U.S. EPA and applied by the California Department of Fish and Game. The U.S. EPA methodology forms the basis for hundreds of water quality criteria throughout the nation. The rationale for the selection of chlorpyrifos water quality objectives based on the application of the U.S. EPA methodology is discussed in detail in Section 4.3 of the report. The Central Valley Water Board believes that the U.S. EPA methodology provides an appropriate basis for establishing water quality objectives and TMDL targets. Also note that the Central Valley Water Board is basing its objectives on its application of the U.S. EPA methodology to the CDFG dataset. The Central Valley Water Board calculations are equivalent to the revised CDFG calculations for diazinon, but differ slightly for chlorpyrifos due to differences in rounding (see Appendix E of the August 2005 Staff report).

Comment 3: The Regional Board's unwillingness to promptly address the error underlying the diazinon WQO's chosen for the Sacramento and Feather Rivers remains unfathomable. While we appreciate and agree that those numbers are legally applicable only to the specified portions of the Sacramento and Feather Rivers, as a practical matter they are being employed elsewhere. Establishment of the San Joaquin and Delta TMDLs would be much simpler and more scientifically legitimate if this issue were resolved.

Response to Comment 3: On May 6, 2005 the Sacramento County Superior court denied the petition from the commenter on this issue. As discussed in the August 11, 2004 letter from the Central Valley Water Board to the commenter, the Central Valley Water Board intends to address the diazinon objective for the Sacramento and Feather Rivers by June 2007 and has been ordered by the Court to do so. Addressing that objective at this time is outside the scope of this proposed Basin Plan Amendment.

Comment 4: Third, your reference to using "effects" as a basis to set a diazinon target is intriguing, but requires further consideration. It is clear, however, that to the extent "effects" are to be employed, the Scholz study cannot rationally be the source of a target.

Response to Comment 4: The scientific peer review of the proposed Amendment suggested that there is not sufficient scientific information currently available to establish a water quality target for diazinon for salmonid behavioral effects based solely upon the Scholz 2000 study. The Central Valley Water Board agrees with that assessment and has revised the report and proposed Amendment accordingly.

Comment 5: Fourth, the additivity issue is only relevant to diazinon and chlorpyrifos if detected concentrations of both OPs occur concurrently in the environment. Analysis of recent diazinon and chlorpyrifos monitoring data for the San Joaquin River watershed shows very low (or no) co-occurrence of these OPs. High

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chlorpyrifos /low diazinon use in the irrigation season and low chlorpyrifos/high diazinon use in the dormant season strongly support these observations.

Response to Comment 5: The Central Valley Water Board agrees that if there are no co-occurrences of diazinon and chlorpyrifos, then additive toxicity of these two pesticides will not occur, however simultaneous detections of these two pesticides have occurred within the last five years. In addition, the potential for additive toxicity must be addressed in the Basin Plan amendment (see Basin Plan; pages III-6.00 and III-8.00, “No individual pesticide or combination of pesticides shall be present in concentrations that adversely affect beneficial uses”. Also see Policy for Application of Water Quality Objectives, pages IV-17.00-18.00 in the Basin Plan).

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2. Debra Leibersbach, P.E., Turlock Irrigation District

Comment 1: Agricultural facilities within the San Joaquin River watershed convey agricultural as well as urban discharges. Although diazinon and chlorpyrifos are no longer being sold within the urban setting, there are likely many people living in the local communities that still have access to these chemicals (e.g. they purchased it before it was removed from shelves, friends and family with agricultural lands, etc.) With the extremely low water quality objectives proposed, even a small amount of these chemicals discharged from urban sources could have an impact on whether or not water quality objectives are exceeded. As a result, it is inappropriate to assume that agriculture is the sole-source of any potential exceedances or to leave up to the agricultural community to do studies to show urban sources are contributing to the problem.

The Regional Board should require urban agencies that discharge stormwater and nuisance water (urban runoff generated outside of storm events) to monitor discharges to local waterways for these chemicals over the next several years to verify the presence or absence of the pesticides. Should these chemicals be present in urban discharges, and exceedances are identified, then BMPs should be required within the urban setting, or allowances should be made for exceedances due to urban influences.

Response to Comment 1: The use of diazinon and chlorpyrifos in urban areas is anticipated to be insignificant by 2010, when compliance with the water quality objectives and loading capacity in this Basin Plan amendment will take effect. Chlorpyrifos has not been available for consumer purchase since December 2001 (except for some enclosed baits) and diazinon has not been available for consumer purchase since December 2004. Any remaining consumer supplies should be depleted or repurchased through the manufacturers' buy back program before this amendment takes effect. The purchase of these pesticides from agricultural outlets for use in urban areas is a violation of label restrictions and is therefore illegal. If such activities are known to occur, they should be reported to the California Department of Pesticide Regulation and to the local County Agricultural Commissioner's office.

Urban stormwater agencies will be required to comply with the wasteload allocations in the amendment. It is anticipated that once this amendment takes effect, NPDES permits that are not already in conformance with the amendment will be updated to comply with it. As discussed in the Staff Report, changes to existing NPDES permit requirements are not anticipated in response to this Amendment.

Comment 2: The numerical water quality objectives to be adopted by the Regional Board should be established based on sound science. New information may be available from the manufacturers and others that indicate a less restrictive standard is appropriate. In addition, there does not seem to be a basis for the proposed "additive toxicity" requirements.

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Response to Comment 2: Staff agrees that numerical water quality objectives should be scientifically defensible and we believe the proposed water quality objectives and TMDL targets were derived using sound scientific methods. The Central Valley Water Board is not aware of new information suggesting the appropriateness of objectives less restrictive than those proposed.

The basis for the additive toxicity requirements is found in the Basin Plan (see Basin Plan; pages III-6.00 and III-8.00, “No individual pesticide or combination of pesticides shall be present in concentrations that adversely affect beneficial uses”. Also see Policy for Application of Water Quality Objectives, pages IV-17.00-18.00 in the Basin Plan). As discussed in the Staff Report (August 2005), diazinon and chlorpyrifos have a similar mode of action and exhibit additive toxicity.

Comment 3: The Regional Board should work with the local Coalitions to identify BMPs that could be implemented. Sufficient time should be given to implement any necessary changes.

The local Agricultural Commissioners, which along with the Department of Pesticide Regulations establishes and monitors the rules and regulations under which these chemicals are applied, can assist by establishing additional application requirements to ensure BMPs are implemented.

Response to Comment 3: Regional Board staff are currently working with some of the Coalitions to identify, evaluate and implement BMPs that will address pesticide runoff. Recently \$45 million in bond funds have been provided for the improvement of agricultural water quality, including grants funding the evaluation and implementation of pesticide BMPs. This Basin Plan amendment recommends a five-year time schedule for compliance with the water quality objectives, load and wasteload allocations.

The Department of Pesticide Regulation (DPR) has developed dormant spray regulations that include BMPs and are anticipated to address the dormant season portion of this amendment. Any additional assistance from DPR and the County Agricultural Commissioners in implementing this amendment is welcomed.

Comment 4: The proposed Management Plans should only be required where the pesticides are being utilized. Only the Coalitions and/or individual dischargers under the Ag Waiver program that apply the products should be required to develop management plans and monitor for compliance. Those that do not use the products, should be exempt from the requirements.

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Response to Comment 4: As used in the Basin Plan Amendment Language concerning Management Plans, the term “discharger” presumes that the discharger is using diazinon and/or chlorpyrifos in their agricultural operations. Management plans requirements for this Basin Plan Amendment will only apply to potential dischargers of diazinon and/or chlorpyrifos.

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3. Walter Ward, Assistant General Manager, Water Operations, Modesto Irrigation District

Comment 1: Modesto ID staff have reviewed water quality monitoring data from MS4 NPDES permit holders and found that both chlorpyrifos and diazinon are regularly present in their stormwater discharges. We encourage RWQCB staff to review the monitoring data from various MS4 NPDES permit holders to determine the significance of the contribution urban runoff makes to the OP pesticide problem. Many San Joaquin Valley cities discharge stormwater to canals, drains and creeks that also carry agricultural irrigation supply and runoff water, therefore it is not possible to assign full responsibility to agriculture.

Response to Comment 1: See response to Comment 1 from Turlock Irrigation District.

Comment 2: If not already doing so, the RWQCB should work with the coalitions to identify OP pesticide specific BMPs. Time should be given to allow the Ag Waiver process to identify and correct problems.

Response to Comment 2: Regional Board staff are currently working with some of the Coalitions to identify BMPs that will address pesticide runoff. This Basin Plan amendment recommends a five-year time schedule for compliance with the water quality objectives, load and wasteload allocations.

Comment 3: Only dischargers who use OP pesticides should be required to write and implement the proposed Management Plans.

Response to Comment 3: See response to Comment 4 from Turlock Irrigation District.